Rafael "ChOkO" Trassi
choko@rtfm-ctf.org

PART 0

INTRO

I really enjoyed and learned a lot during this Holiday Hack Challenge! Thank you very very much! You guys are awesome! I've been playing CTFs for 2 years now (i'm the captain and co-founder of the **RTFM** - Red Team Freakin' Maniacs brazilian CTF team) and also organized a few competitions. I realize how much effort is necessary to make a CTF, but you guys really pushed it to the next level! What a great experience! Once again thank you very much for all your effort, incredible job guys!!

I've started writing this report 11:17 PM BRT (GMT -3). Sorry if I miss something!

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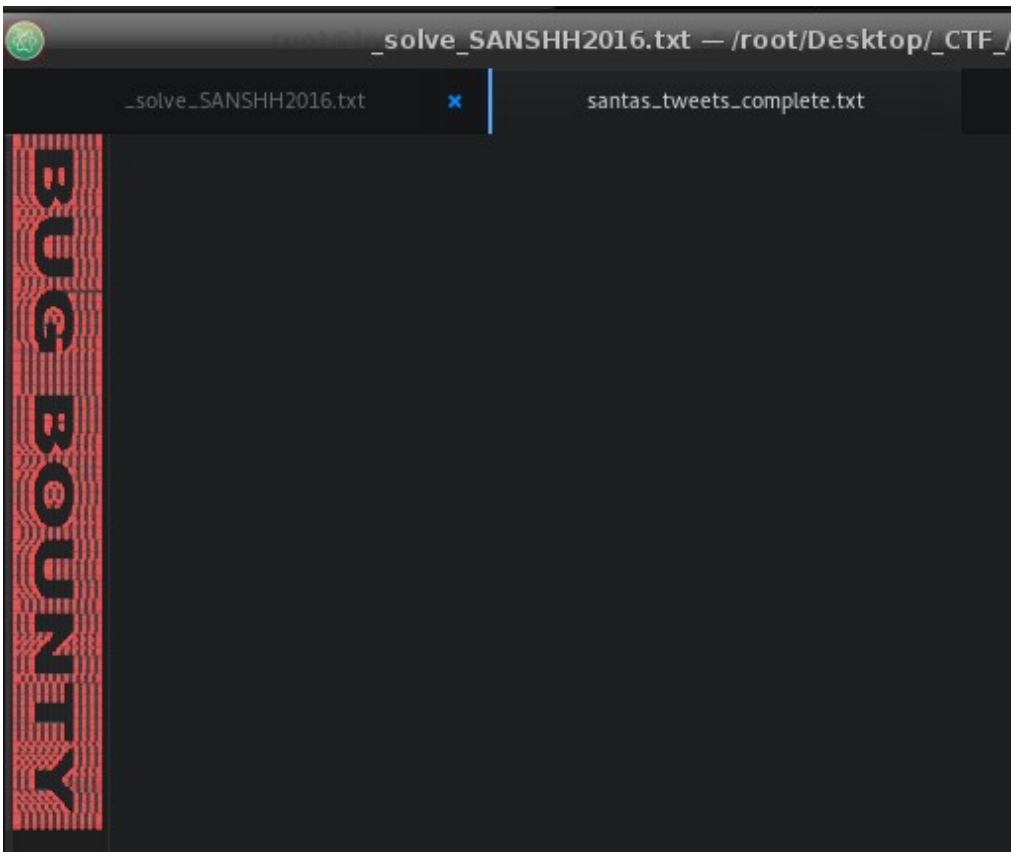
PART 1

1) What is the secret message in Santa's tweets?

--> *BUG BOUNTY*

I've entered @santawclaus' Twitter page and loaded all comments. Then i saved the HTML as 'tweets_all.html'. I've used the following shell-fu to solve the secret message:

```
grep 'TweetTextSize' tweets_all.html | cut -d '>' -f2 | cut -d '<' -f1 > santas_tweets_complete.txt
```



2) What is inside the ZIP file distributed by Santa's team?
--> Using the BUG BOUNTY password I could extract the SantaGam_v4.2.zip and there's the SantaGram_4.2.apk file, the social network mobile app used for Santa and his elves and now us :D

f148863aa2af9be5c54cf84c37b446a61d5684e1a2ffc65a970c01892b6b2d86
SantaGram_4.2.apk

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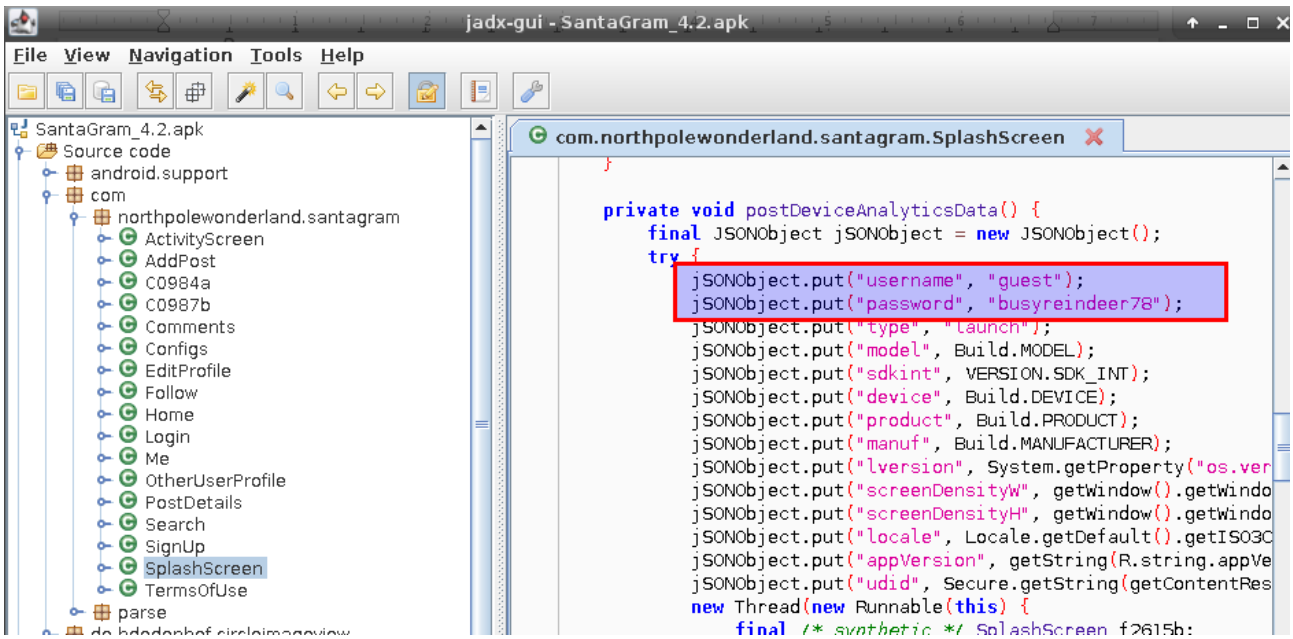
PART 2

3) What username and password are embedded in the APK file?
--> user: guest password: busyreindeer78

To solve this I've first unzipped the APK. Ran d2j-dex2jar on the classes.dex file and then opened the resulting jar file on JD-GUI. I've saved all the sources (*.java files) and then ran a quick 'grep -riE "user|pass" .'.
I found two files that contained those credentials: b.java and SplashScreen.java.
(then I found a fellow elf and he told me I should use jadx-gui \o/ wow I loved it! Thanks a lot master elf!! :)



4) What is the name of the audible component (audio file) in the SantaGram APK file?
--> *discombobulatedaudio1.mp3*

After unzipping the APK i've found it at the following path
--> ./unzip/res/raw/discombobulatedaudio1.mp3

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PART 3

5) What is the password for the "cranpi" account on the Cranberry Pi system?
--> *yummycookies*

To solve this i've mount the cranbian-jessie.img using the following command:
mount -o offset=$((512*137216)) -t ext4 cranbian-jessie.img /mnt/cranberry

Then i've copied the shadow and passwd files to a /tmp folder and used unshadow to generate the password.txt file to be cracked.
cp /mnt/cranberry/etc/passwd /tmp/passwd; cp /mnt/cranberry/etc/shadow /tmp/shadow
umask 077; unshadow /tmp/passwd /tmp/shadow > /tmp/password.txt

Then i've ran John The Ripper with the rockyou.txt wordlist to retrieve the password.
john --wordlist=/usr/share/wordlists/rockyou.txt /tmp/password.txt

yummycookies (cranpi)

6) How did you open each terminal door and where had the villain imprisoned Santa?

--> The villain imprisoned Santa in the DFER (Dungeon For Errant Reindeer) back in the PAST (1978)!

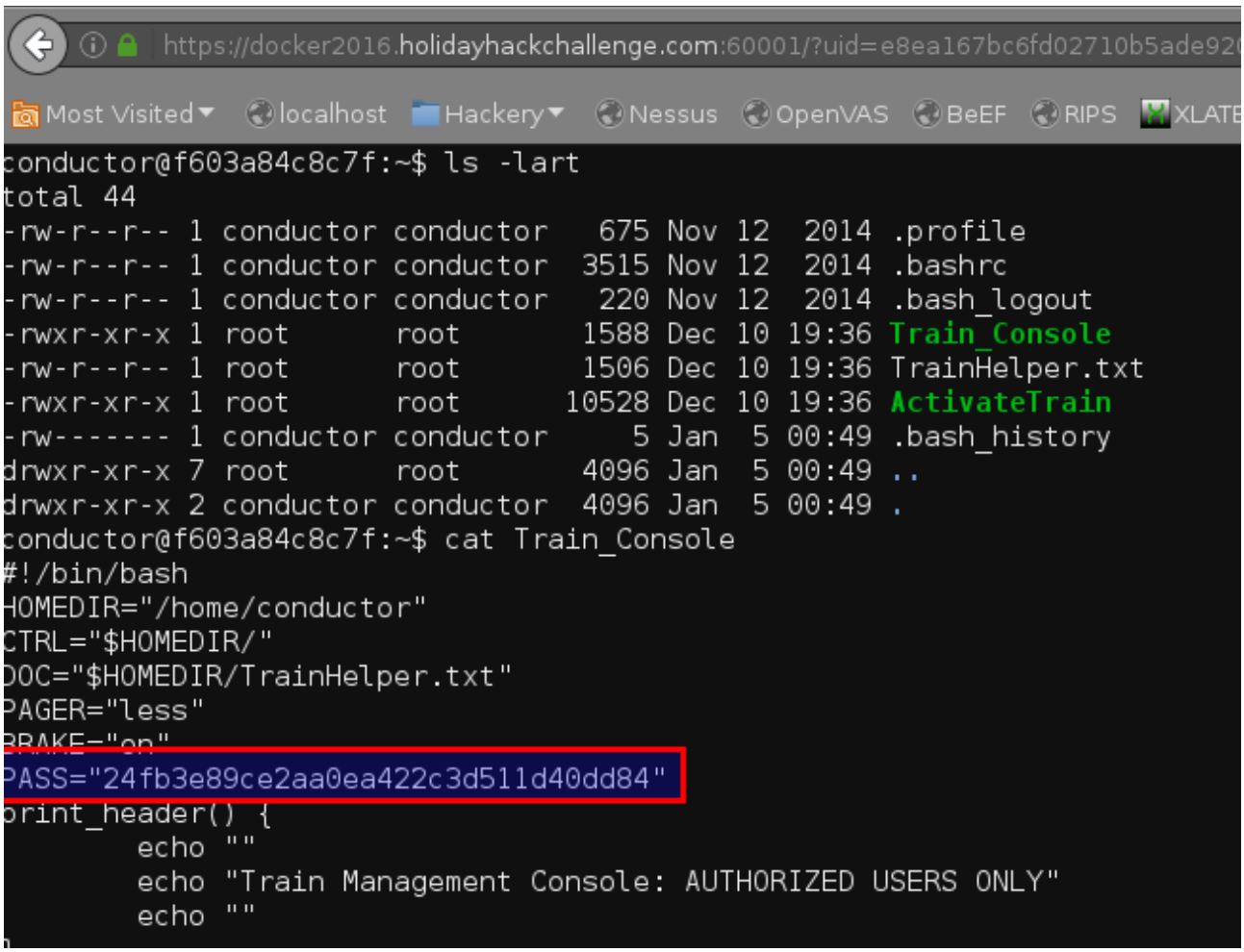
There were a total of 6 terminals (I believe o_O).

--[0x01 - TRAIN TERMINAL]

URL: https://docker2016.holidayhackchallenge.com:60001/?uid=e8ea167bc6fd02710b5ade920524da1cb71910ad

--> After playing with the terminal i noticed that the HELP command was opening LESS (there was even a hint on the text, where it read: "... this console cannot do it, unLESS you know something I don't." \o/!).

After that i spawned a shell with the '!/bin/bash' command and read the Train_Console script to find the password (PASS="*24fb3e89ce2aa0ea422c3d511d40dd84*"). That password was used after you START the train (after a BRAKEOFF command). Now we can time travel! \o/



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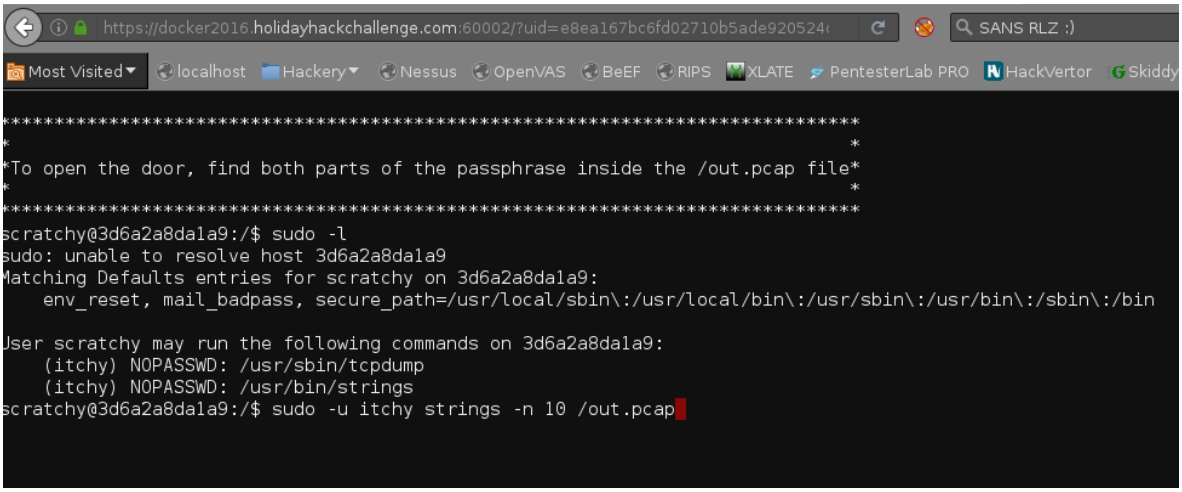
--[0x02 - ELF HOUSE #02]

URL: https://docker2016.holidayhackchallenge.com:60002/?uid=e8ea167bc6fd02710b5ade920524da1cb71910ad

→ This was very entertaining! We were scratchy trying to read the contents of the /out.pcap file which was owned by itchy. After crying a lot, trying to escalate privileges and desperating myself, i remember to run 'sudo' ^_^. So i finally ran strings and could extract the first part. After searching a lot i got a hint from one of the other challengers and finally ran string with the '--encoding={b,l}' parameter!
 - First half was "santasli"
 - Second half was "ttlehelper

Passphrase: santaslittlehelper



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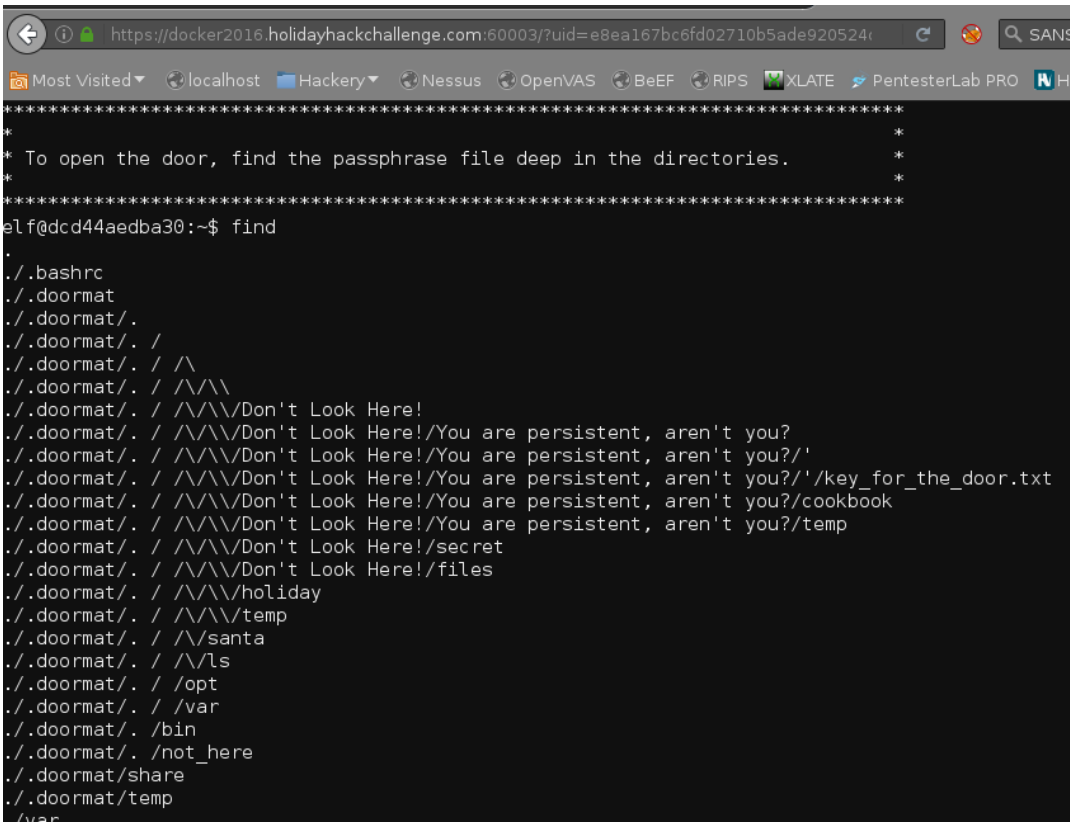
--[0x03 - WORKSHOP 01 - DEEP DIRECTORIES]

URL: https://docker2016.holidayhackchallenge.com:60003/?uid=e8ea167bc6fd02710b5ade920524da1cb71910ad

Running find without parameters would quickly reveal the directory structure:



After that I ran ‘grep -ri .’ to read the file ;)

Passphrase: open_sesame

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--[0x04 - WORKSHOP 02 - WUMPUS]

URL: https://docker2016.holidayhackchallenge.com:60004/?uid=e8ea167bc6fd02710b5ade920524da1cb71910ad
I've really played the wumpus game! \o/ It make me remember my childhood when i learned to play those RPG textbooks (like Ian Livingstone's City of Thieves). The first thing i learned was to draw a map ;) After playing a couple times (always choosing to play the same cavern after i died) i could kill that beast and retrieve the passphrase for that door!

Passphrase: WUMPUS IS MISUNDERSTOOD

Note: This is a key door since opens to the DFER (Dungeon For Errant Reindeer), where we can find Santa chillin' (is he really?) and healing from a head wound back in 78!

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--[0x05 - SANTA'S OFFICE]

URL: https://docker2016.holidayhackchallenge.com:60005/?uid=e8ea167bc6fd02710b5ade920524da1cb71910ad
How awesome is the terminal in the Santa's Office? \o/ I got to type the sequence of the very first hacker movie i ever watched omg thank you very much about that! <3 After typing everything we accessed the Corridor ;) And for my surprise, there was no terminals! (oh and there was like 43023094823 hackers stacking trying to find about the audios hehehe it was fun :)

Passphrase: LOOK AT THE PRETTY LIGHTS

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--[0x06 - *another* TRAIN TERMINAL]

URL: https://docker2016.holidayhackchallenge.com:60006/?uid=e8ea167bc6fd02710b5ade920524da1cb71910ad

I believe this was the very same challenge solved on 0x01. If you hid something in there please, do tell meee! :b

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PART 4

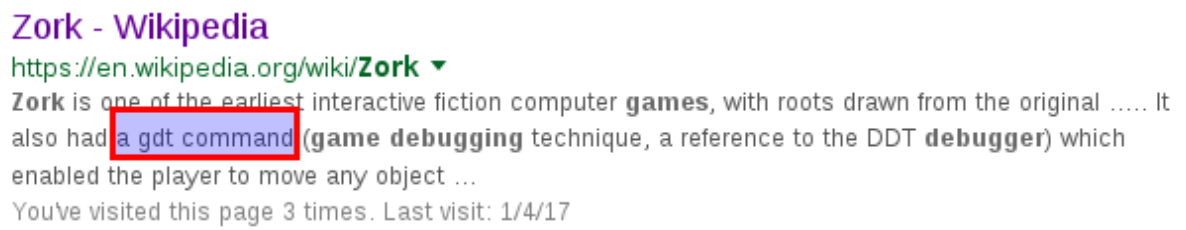
7) ONCE YOU GET APPROVAL OF GIVEN IN-SCOPE TARGET IP ADDRESSES FROM TOM HESSMAN AT THE NORTH POLE, ATTEMPT TO REMOTELY EXPLOIT EACH OF THE FOLLOWING TARGETS:

The Mobile Analytics Server (via credentialed login access)
The Dungeon Game - DONE
The Debug Server
The Banner Ad Server - DONE
The Uncaught Exception Handler Server
The Mobile Analytics Server (post authentication)

For each of those six items, which vulnerabilities did you discover and exploit?

35.184.47.139 – dungeon.northpolewonderland.com
--> There is a cheat in dungeon game (**Zork**). I run the following commands to win:

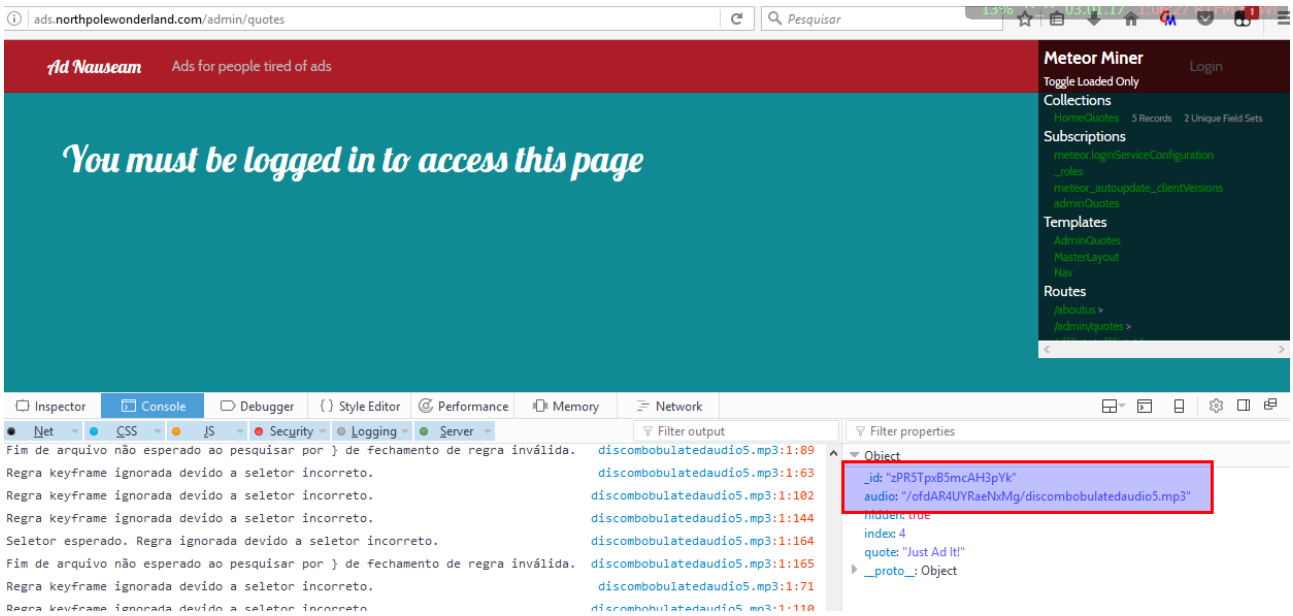
1. gdt
2. DT
3. 1024



Then after sending the message I got the elf's reply with the audio ;)

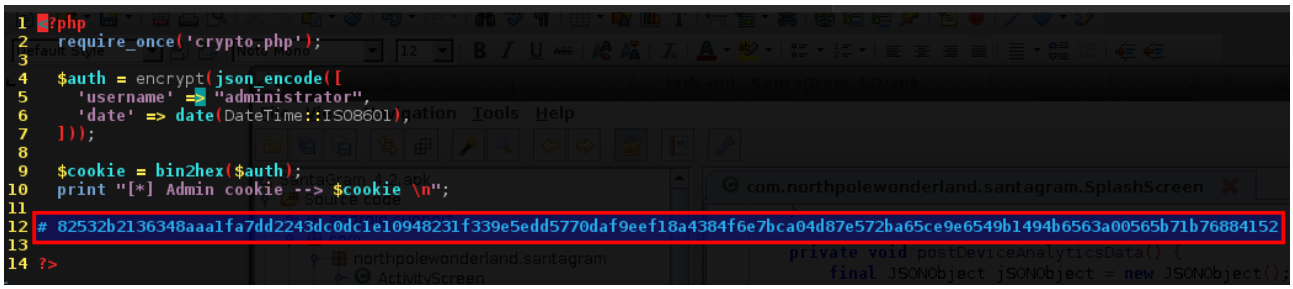
35.184.63.245 - dev.northpolewonderland.com – **not exploited T__T**
104.154.196.33 - ex.northpolewonderland.com – **not exploited T__T**

104.198.221.240 - Banner AD Server - ads.northpolewonderland.com
--> I've just used MeteorMiner (great tool btw!) and found the audio inside the HomeQuotes collection on ../admin/quotes.



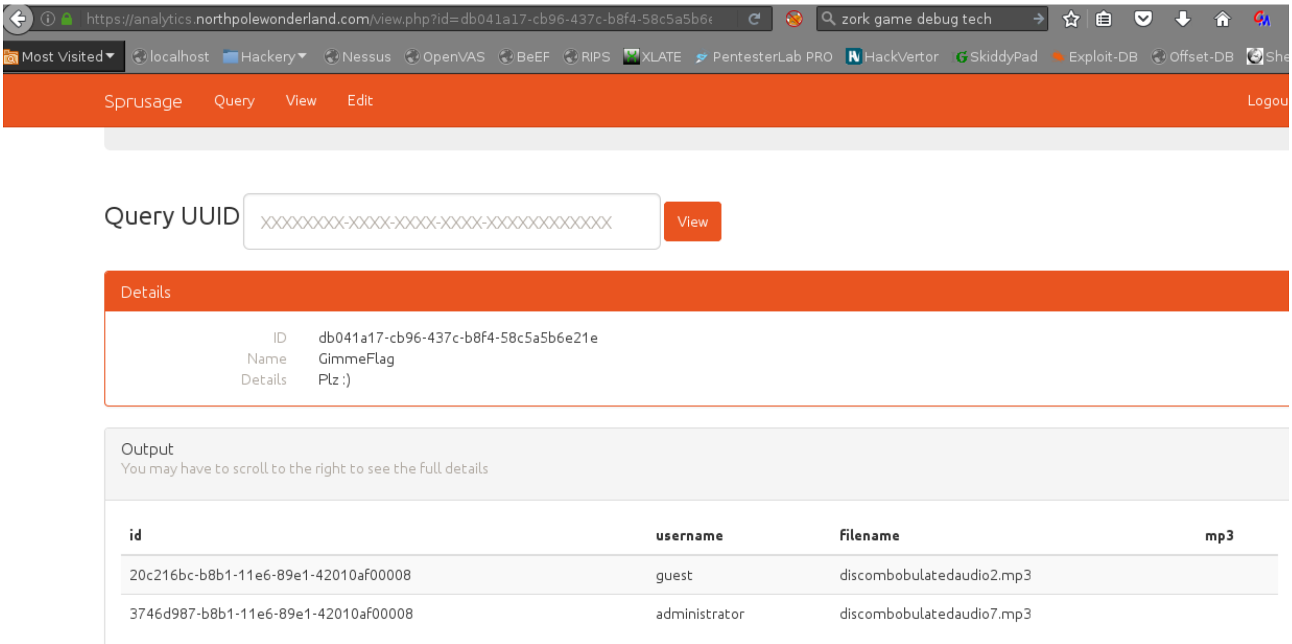
104.198.252.157 - analytics.northpolewonderland.com
--> The analytics server was quite challenging! First I could log in using the hardcoded credentials, no problem getting its first audio.mp3.

Then I fiddle around a lot until I tried a full nmap scan with scripts and found the .git folder. After I managed to retrieve the sources I could log as the *administrator* after studying crypto.php and changing the value of the AUTH cookie to *82532b2136348aaa1fa7dd2243dc0dc1e10948231f339e5edd5770daf9eef18a4384f6e7bca04d87e572ba65ce9e6549b1494b6563a00565b71b76884152.*

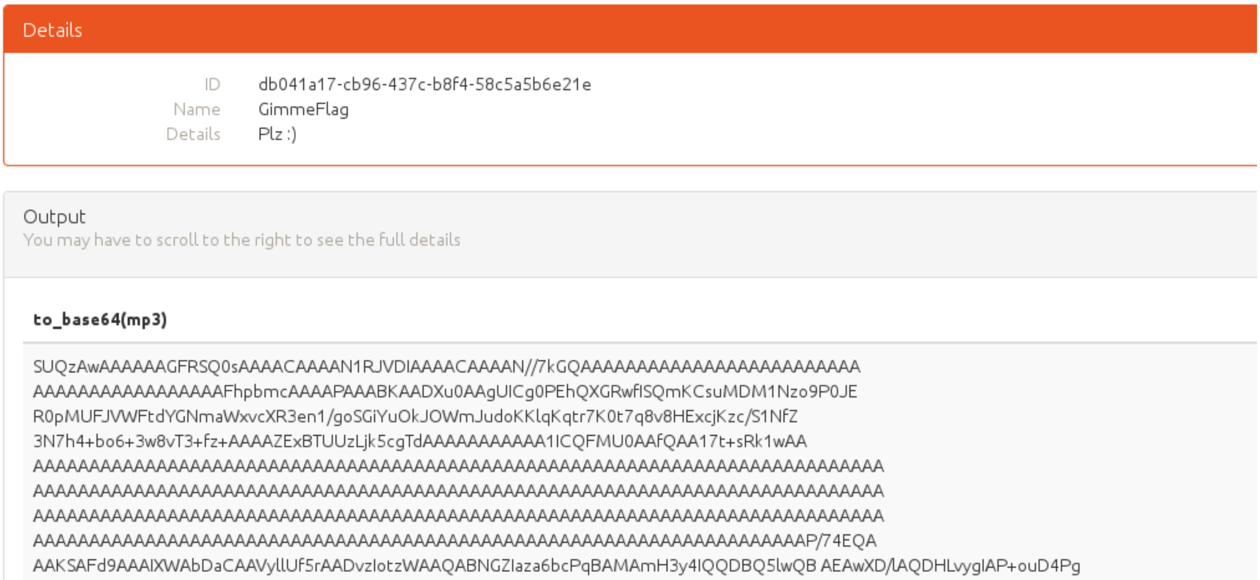


After that I could mess with edit.php. I noticed the 'Yup' messages when editing some reports, but the 'query' parameter never got a Yup. I input the 'query' parameter manually at the end of the GET request, trying a query to the audio table (select * from audio).

This was the query that i've used to see the mp3 and their id's: https://analytics.northpolewonderland.com/edit.php?id=db041a17-cb96-437c-b8f4-58c5a5b6e21e&name=GimmeFlag&description=Plz+%3A%29&query=select%20*%20from%20audio



I noticed that the mp3 column was empty, then I messed around a lot and eventually *Alex* saved me (big thanks to **@amccormack**) with the idea that php code might not show null-bytes if there were any when loading the mp3 binary content. Then I managed to retrieve it encoding the binary with base64, fixed my query to --> *&query=select to_base64(mp3) from audio where id = '3746d987-b8b1-11e6-89e1-42010af00008'* . Only then I was able to decode the base64 and retrieve the part7 of the mp3! (who is JEFF? LoL!)



130.211.124.143 - northpolewonderland.com – Only downloads ;)

8) What are the names of the audio files you discovered from each system above? There are a total of SEVEN audio files (one from the original APK in Question 4, plus one for each of the six items in the bullet list above.)

- discombobulatedaudio1.mp3
- discombobulatedaudio2.mp3
- discombobulatedaudio3.mp3
- discombobulatedaudio5.mp3
- discombobulatedaudio7.mp3

```
┌[root@hydra] [/dev/pts/0] [1]
└[~/Desktop/_CTF_/__SANS_HOLIDAY_HACK_CHALLENGE_2016/_SANS_Holiday_Hack_Challenge_2016/___TARGETS_EXPLOIT/_audio_files]> ls -l *.mp3; md5sum *.mp3
-rw-r--r-- 1 root root 214046 Jan  2 23:42 discombobulatedaudio1_santagram_apk.mp3
-rw-r--r-- 1 root root 223248 Jan  4 01:15 discombobulatedaudio2_analytics_credentialed.mp3
-rw--w--w- 1 root root 202362 Jan  2 23:37 discombobulatedaudio3_dungeon.mp3
-rw-r--r-- 1 root root 233357 Jan  3 01:05 discombobulatedaudio5_banner_ads.mp3
-rw-r--r-- 1 root root 220943 Jan  4 20:12 discombobulatedaudio7_analytics_postauth.mp3
b7aca2f218c39b997bfd61b83856aed2  discombobulatedaudio1_santagram_apk.mp3
f05c1ec6c536e455ec686973fa6b8e20  discombobulatedaudio2_analytics_credentialed.mp3
0be15d00299af1a6bc1d11ab6f2696a0  discombobulatedaudio3_dungeon.mp3
3d87c1d31717f81f1966db4133f9e24d  discombobulatedaudio5_banner_ads.mp3
313e7e370fd7d5232bb569f21856d9f4  discombobulatedaudio7_analytics_postauth.mp3
```

On most of the audio I've pu-pu-pu-pushed the TEMPO using Audacity . It took me a while to understand that it wasn't 'Merry Christmas' but 'Father Christmas'. After that I could manage to understand 'Jeff' and then I started looking around.

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PART 5

9) Who is the villain behind the nefarious plot.
--> The villain is Doctor Who! OMG!

10) Why had the villain abducted Santa?
--> He abducted Santa because he really is a madman who clearly doesn't care about the integrity of the universe's timeline, oh and also because he tried to prevent the Star Wars Holiday Special of 1978! \o/

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Once again, GREAT JOB GUYS!! Thank you very very much!

I'm finishing the writing 25 minutes after midnight (brazilian time)! I'd appreciate if you could consider my report as well! Well, after all it really is Jan 4th somewhere in the world ;)

I'm looking forward for the next Holiday Challenge! Best regards to all of you! Hope to meet you soon! Let me know if you come to any conferences in Brazil during 2017!

Best Regards,
Rafael "ChOkO" Trassi